

**READ HEAD SPIN VALVE SENSOR WITH TRIPLE  
ANTIPARALLEL COUPLED FREE LAYER STRUCTURE**

**ABSTRACT OF THE DISCLOSURE**

A triple antiparallel (AP) coupled free layer structure is located between first and second pinned layer structures in a dual spin valve sensor. The triple AP coupled free layer structure includes first, second and third antiparallel (AP) coupled ferromagnetic free layers and nonmagnetic first and second antiparallel (AP) coupling layers. The first AP coupling layer is located between and interfaces the first and second AP coupled free layers and the second AP coupling layer is located between and interfaces the second and third AP coupled free layers. Magnetic moments of the first and third AP coupled free layers are parallel with respect to one another and, because of a strong antiparallel coupling, the second AP coupled free layer pins magnetic moments of the first and third AP coupled free layers antiparallel thereto. In a preferred embodiment the first and third AP coupled free layers are cobalt based for promoting a high magnetoresistance of the sensor and the second AP coupled free layer is nickel iron based for promoting sensitivity of the free layer structure to signal fields.

5

10